The concentration of Nuf, a Rab11 effector, at the microtubule-organizing center is cell cycle regulated, dynein-dependent, and coincides with furrow formation.

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Public Summary:
Animal cytokinesis relies on membrane addition as well as acto-myosin-based constriction. Recycling endosome (RE)-derived vesicles are a key source of this membrane. Rab11, a small GTPase associated with the RE and involved in vesicle targeting, is required for elongation of the cytokinetic furrow. In the early Drosophila embryo, Nuclear-fallout (Nuf), a Rab11 effector, promotes vesicle-mediated membrane delivery and actin organization at the invaginating furrow. Although Rab11 maintains a relatively constant localization at the microtubule-organizing center (MTOC), Nuf is present at the MTOC only during the phases of the cell cycle in which furrow invagination occurs. We demonstrate that Nuf protein levels remain relatively constant throughout the cell cycle, suggesting that Nuf is undergoing cycles of concentration and dispersion from the MTOC. Microtubules, but not microfilaments, are required for proper MTOC localization of Nuf and Rab11. The MTOC localization of Nuf also relies on Dynein. Immunoprecipitation experiments demonstrate that Nuf and Dynein physically interact. In accord with these findings, and in contrast to previous reports, we demonstrate that microtubules are required for proper metaphase furrow formation. We propose that the cell cycle-regulated, Dynein-dependent recruitment of Nuf to the MTOC influences the timing of RE-based vesicle delivery to the invaginating furrows.

Scientific Abstract:
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